(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 323 657 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **88202728.7**

(51) Int. Cl.4: **D01H 13/00 , B65H 54/26**

(22) Date of filing: **30.11.88**

(30) Priority: **18.12.87 IT 2308687**

(43) Date of publication of application:
12.07.89 Bulletin 89/28

(84) Designated Contracting States:
BE CH DE ES FR GB GR LI

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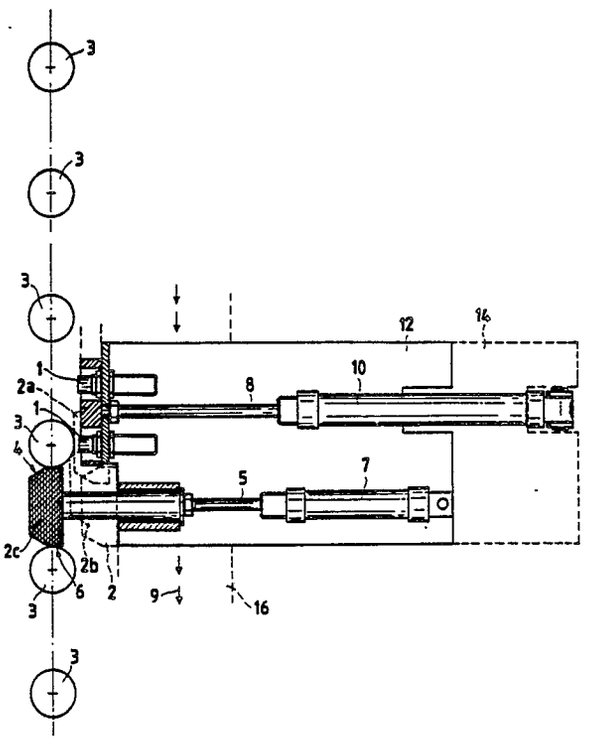
(54) Block-using method and block device for positioning and locking a saddle-borne equipment piece.

(57) The present invention is concerned with a method and a device capable of stopping, positioning and locking an equipment piece borne on board of a mobile saddle (16) during a braking step, with the adjustable braking action being carried out by means of the frontal thrust applied by a positioning block (2), and during the subsequent step of self-centering positioning under the action of the frontal thrust applied by the same positioning block against protruding elements (3) which are substantially given the shape of revolution solids.



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BLOCK-USING METHOD AND BLOCK DEVICE FOR POSITIONING AND LOCKING A SADDLE-BORNE EQUIPMENT PIECE

The present invention comprises a method for positioning and locking an equipment piece carried on board of a mobile saddle provided with translational motion along the sides of the operating machine and furthermore comprises a device for practicing this method.

To date, in the automation of the textile machines, the mobile saddles have been exactly positioned by resorting to pin means, or to fork means, or to means having similar shapes. Said mobile saddles support and house maintenance and/or operating equipment pieces. In the pin means, a push actuator drives the extension of a mechanical pin which, by getting engaged into a bore provided on a plate rigidly fastened onto the framework of the machine, makes it possible the mobile saddle to be locked in its working position. The so carried out positioning and locking unavoidably generates vibrations, of uncontrollable intensity, on the structure of the mobile saddle, with said vibrations being also transferred to the whole equipment piece on board of the same saddle. Said equipment piece submitted to more or less intense vibrations will be damaged, at least in its precision members, such as, e.g., detector and position sensors, as well as operating arms and lever systems. These latter will come to operate in their movements along incorrect coordinates, in that their supports may result to be more or less deformed owing to the repeating impacts generated by the sudden stops of the mobile saddle.

In the fork means, an actuator actuates the extension of the prongs of the said fork, engaging them to surround a protruding element rigidly fastened to the framework of the machine.

Also in case of such a positioning and locking means, more or less intense vibrations are triggered as well, and the same above mentioned operating drawbacks will therefore occur. Furthermore, the fork must be associated to the presence of a tooth, or latch, capable of ensuring the saddle stopping lock during the whole time period of intervention of the equipment piece borne by said mobile saddle. The structure of the fork locking means is therefore not simple.

The purpose of the present invention is of overcoming the above mentioned drawbacks, by providing a positioning and locking method, by means of which the mobile saddle can be stopped at a precise point, without considerable vibrations being generated and transmitted on the supported equipment piece borne by said mobile saddle. In order to practice this method, the use is advantageous of a device in conformity with claim 2 of the present invention.

This device is characterized by a simple structure, and makes it also possible a reliable precision to be achieved over time, in that it is neither damaged nor worn during the operations; and, thanks to its structural simpleness, it is also very reliable in operation, and not sensible to dirtying effects. This device is associated with means known from the prior art for the automatic monitoring and detection of the points wherein the equipment piece supported by the saddle must perform its action, with said saddle running along rail guides provided along the working front(s) of a textile machine, such as, e.g., a ring spinning frame. Inasmuch as said saddles used for the automatic intervention for the splicing of broken threads on continuous spinning frames equipped with ring rail, and the equipment pieces associated with it, as well as the relevant operating members, including their system for programmed control, have structural features known from the prior art, they do not need to be herein explained in detail.

The invention relates hence to a method for stopping and positioning an equipment piece borne on board of a mobile saddle provided with its own translational movement along the sides of the machine. According to said method, a first braking action of adjustable intensity takes place by means of the change in intensity of the thrust applied by the positioning block against protruding elements which are substantially given the shape of revolution solids, and a subsequent action of self-centering positioning takes place by means of the frontal thrust applied by the inclined side of the positioning block to the revolution surface of a protruding element.

The device used for practicing the above mentioned method comprises a positioning block which is provided with two frontal bevels of consistent size, in order to subdivide each one of both side surfaces into two geometrically different sections: the one section is rectilinear inclined; the other section, adjacent to the first one, is substantially rectilinear and parallel to the direction of the thrust applied by the same positioning block. The rectilinear inclined section ensures the self-centering positioning; the other section, rectilinear and parallel to the direction of the thrust applied by the positioning block, ensures the locking and the preservation of the exact alignment of the traveling equipment piece to the spinning spindle around which the working units advance and operate.

According to a form of practical embodiment,

the frontal bevels of the positioning block are of circular, or substantially circular, shape.

In the only one hereto attached drawing table, an example of practical embodiment of the invention is shown in a schematic view, and exclusively as regards those parts which need to be explained as regards the action of friction braking, and of self-centering positioning.

The figure of the drawing table shows a top plan view of the device according to the present invention, with the sensor members which are required in order to enable the mobile saddle speed reducing system; it should be observed that these sensor members are not represented in their details, in that they are inside the knowledge of those skilled in the art.

In the only one hereto attached drawing, we have that:

1 are proximity sensors of inductive type aligned along the running direction of the saddle, operating in order to detect the frontal presence of the elements 3 and in order to scan the passage of the saddle 16 from spinning spindle to spinning spindle and to supply, in the programmed logic and in cooperation with other sensors, first the activation of the sources saddle speed reducing command, and then the activation of the actuator 7 until the saddle 16 stops in a position exactly aligned with the spindle, on which an action has to be performed;

2 is the positioning block, which can be made from a metal material, or from a non-metal material, or from any other composite materials;

2a, 2b and 2c are the frontal positions which the block 2 takes in the operating step of positioning beginning, until the end of the insertion thereof between two adjacent elements 3 in order to lock the mobile saddle 16;

3 are the protruding elements which are substantially given the shape of revolution solids, and are installed in correspondence of the lower part of the spindles. Said protruding elements have their axis coincident with the axis of the spindles, and therefore their pitch corresponds to the pitch between the spindles;

4 is the side bevel, which is in the form of an inclined rectilinear section, in order to ensure the self-centering positioning of the mobile saddle;

6 is the side surface section of the block 2, which is substantially rectilinear and parallel to the direction of the thrust applied by the stem 5;

5 is the stem of the block 2 thrust actuator;

7 is the positioning block thrust actuator;

8 is the stem of the actuator 10, which makes the slide 12 supporting the device according to the present invention, to move forwards or backwards;

14 is the backwards-moved position of the saddle 12, in order to make it possible the device according to the present invention not to be operating;

9 is the arrow which indicates the direction of advancement of the mobile saddle during its patrolling looking for the spinning spindles on which an action has to be carried out;

16 is the partial trace of the framework of the mobile saddle onto which the device according to the present invention is fastened.

The following disclosure of the operation, made by referring to the only one hereto attached figure, is above all referred to all novelty elements, and therefore concerns solely the device according to the present invention, which carries out the positioning and the locking of a mobile saddle associated to an equipment piece for the automatic maintenance of one or several machine front(s). It is understood that, for it to operate, detecting means and complementary devices are necessary, which are not herein discussed.

It is known to associate to a textile machine, such as, e.g., a ring spinning frame, a saddle device in order to automatically re-join the broken threads during the spinning spindles operation. Said saddle is caused to run along the spinning front(s), along running ways comprising one or severalrail(s), of any shapes, cooperating with suitable rolling means such as wheels, or rollers, or equivalent means. During the operation of the spinning frame, the saddle unit for the re-joining of the threads is continuously frontally reciprocated along the spindle bed, performing a reciprocating patrolling function.

During said patrolling monitoring, the traveling device detects, by using detecting means known from the prior art, whether the thread is present or not, on each spinning spindle. When it detects the absence of one of the threads under way of formation, the device, through, and in cooperation with, the proximity sensors 1 of inductive type, as well as through the operating program, enables the actuation of an electrovalve which makes the pneumatic actuator 7 start to operate via the stem 5 and bush the block 2 to its position 2a, coming into frontal interference with the element 3 which comes before the opening into which the same block 2 has to pushed (see the hereto attached figure).

The anticipated advancement of the block 2 relatively to the opening it should enter, inside which it will be locked at the end of the positioning step, is necessary, because the same block 2, by means of its frontal surface, carries out a useful braking action, in order to reduce the speed of the whole saddle during the step of passage from the steady-state patrolling speed to the reduced speed

of positioning beginning. It should be observed that the inertia of a mobile saddle carring on board one or several equipment piece(s) is difficult to evaluate with correctness. With this latter specific statement in mind, the device according to the present invention carries out an adjustable braking effect, by varying, with known means, the intensity of the frontal thrust applied by the block 2 to the element 3 by means of the actuator 7.

When, at the end of the front sliding, the contact begins between the inclined surface 4, and the circumferential surface of the element 3, the block frontally moves to reach its position 2b. At this time point, it is advantageous that a microswitch, entrusted with the task of detecting this frontal movement, disables and stops the saddle driving motor source. The front thrust generated by the actuator 7, the inclined surface 4 of the block 2 and the circumferential surface of the element 3 make it possible, owing to the shape of their contact surfaces, the positioning block 2 to be automatically and gradually wedged into the opening it must enter in order to ensure the precise alignment of the traveling equipment piece with the spinning spindle, around which the working units advance and operate. The preservation of the precise alignment obtained, throughout the necessary time period for the above mentioned operating actions, is ensured by the surface section 6 of the positioning block 2. Any fortuitous translating forces are in fact nullified by the planar contact between the surface 6 and the element 3.

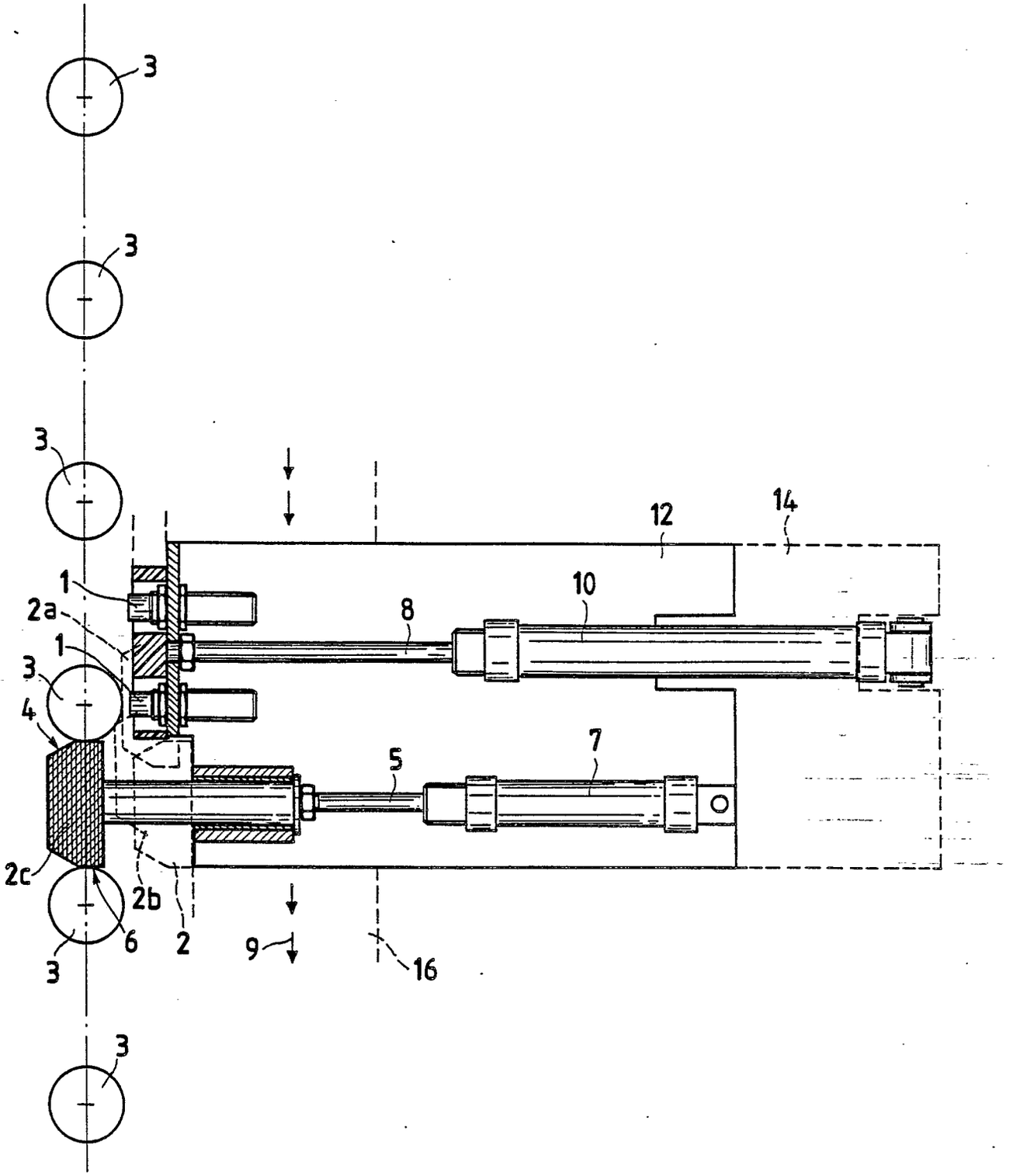
It is clear that the present invention proposes a method and a device suitable for positioning and stopping a mobile car traveling along the operating fronts of machines, without causing considerable impacts and vibrations which, should be present, would damage the equipment pieces, or equipment piece parts, carried on board by said saddle.

Claims

1. Method for stopping and positioning an equipment piece borne on board of a mobile saddle running by translational motion along the sides of an operating machine, characterized in that it comprises the following operations, carried out in sequence:
- an adjustable friction braking, with its braking friction being controllable by means of the thrust applied by the positioning block in order to coadjuvate the system entrusted with the slackening of the motion of the mobile saddle;
- a self-centering positioning, with the self-centering feature being due to the action caused by the frontal thrust applied by the positioning block to protruding elements, which are substantially given the shape of revolution solids.

2. Device used for practicing the method according to claim 1, characterized in that it comprises a positioning block which is provided with two frontal bevels of consistent size, in order to subdivide each one of both side surfaces into two geometrically different sections: the one section is rectilinear inclined; the other section, adjacent to the first one, is substantially rectilinear and parallel to the direction of the thrust applied by the same positioning block; the rectilinear, inclined section ensures the self-centering positioning; the other section, rectilinear and parallel to the direction of the thrust applied by the positioning block, ensured the locking and the preservation of the exact alignment of the traveling equipment piece with the spinning spindle around which the working units advance and operate.

3. Device according to claim 2, characterized in that it comprises frontal bevels provided on the positioning block, which are of circular, or substantially circular, shape.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EUROPEAN SEARCH REPORT

Application Number

EP 88 20 2728

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	EP-A-124151 (OFFICINE SAVIO S.P.A.) * page 8, line 33 - page 11, line 15; figures 3b, 4a.4b *	1, 2	D01H13/00 B65H54/26
A	DE-A-3536850 (ZINSER TEXTILMASCHINEN GMBH) * column 4, line 50 - column 5, line 20; figure 1 *	1, 2	
A	DE-A-2117585 (MAREMONT CORP.) * claim 1; figures 3-8 *	1, 2	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

D01H
B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	13 APRIL 1989	HOEFER W.D.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P0401)